

Piano Technician IV

PEIMS Code: N1170200

Abbreviation: PINTECH4

Grade Level(s): 11-12

Award of Credit: 1.0

State Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to [TAC §74.13](#) for guidance on endorsements.

Course Description:

The Piano Technician IV course is the completion course in piano tuning and technical skills with an emphasis on refining tuning, repairs, introducing voicing and business management practices. The Piano Technician IV courses will provide students with the knowledge, skills, and technologies required for employment in the music industry as a piano tuner or piano technician. Students will perfect tuning theory in practice, string repairs/replacement, piano moving, cabinetry repair, voicing, regulation, action repair, financial literacy, professional conduct, and OSHA safety protocols.

Upon successful completion of the set of Piano Technician courses, the skills taught will allow students to begin advanced study at trade or postsecondary schools, as well as begin working at institutions and piano dealers as a fully competent piano technician.

Essential Knowledge and Skills:

- (a) General Requirements: This course is recommended for students in Grade 12. Required prerequisite completion of Piano Technician III. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
 - (1) Fine arts instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in the current piano tuning/technician profession.
 - (2) The Piano Technician IV course is the completion course in piano tuning and technical skills with an emphasis on refining tuning, repairs, introducing voicing and business management practices. The Piano Technician IV courses will provide students with the knowledge, skills, and technologies required for employment in the music industry as a piano tuner or piano technician. Students will perfect tuning theory in practice, string

repairs/replacement, piano moving, cabinetry repair, voicing, regulation, action repair, financial literacy, professional conduct, and OSHA safety protocols.

- (3) Students are encouraged to participate in extended learning experiences such as shop projects, private lessons in piano tuning, group lessons in related topics, tuning district-owned equipment with supervision, and supervised practice at local piano dealers.

(c) Knowledge and Skills.

- (1) The student demonstrates professionalism in the quality of their workmanship. The student is expected to:
- (A) explain the importance of ongoing education and development in building and cultivating a skill set;
 - (B) explain the importance of ensuring that the quality of work meets the expectations of the customer as well as company and industry standards;
 - (C) explain why clear communication is necessary to ascertain the expectations of the customer;
 - (D) provide examples of effective communication strategies;
 - (E) explain the importance of continual re-evaluation and refinement of one's work;
 - (F) explain the importance of completing a job in a timely manner; and
 - (G) explain the importance of notifying a customer of unexpected issues or repairs that may extend the time or cost necessary to finish the work.
- (2) The student describes the parts of the piano and their function as well as explain piano tuning theory. The student is expected to:
- (A) demonstrate knowledge of the various parts of the piano, including essential components of the piano action, keyboard, pedal mechanisms, soundboard bridge, pinblock, strings, string bearing components and cabinetry;
 - (B) use proper nomenclature for parts of the piano, including essential components of the piano action, keyboard, pedal mechanisms, soundboard bridge, pinblock, strings, string bearing components and cabinetry;
 - (C) explain the relationship of the natural overtone series to equal temperament tuning;
 - (D) explain the purpose of equal temperament in historical context;
 - (E) compare and contrast differences in cents for pitches tuned in both just temperament and equal temperament; and
 - (F) demonstrate knowledge of narrow and wide intervals.
- (3) The student evaluates the function and application of the tools, equipment, technologies, and materials used in piano tuning and repair. The student is expected to:
- (A) follow industry standard safety protocols in shop workspaces and while using piano tuning/technician tools and equipment;
 - (B) use appropriate personal protective equipment while tuning, repairing, and moving pianos;

- (C) demonstrate knowledge of referencing pitches with a tuning fork and with an electronic tuning device;
 - (D) hold the tuning hammer properly, which allows for the correct setting of the tuning pin;
 - (E) position the tuning hammer between twelve and two o'clock to provide appropriate leverage on the tuning pin;
 - (F) set the tuning pin securely to ensure no cent variation when struck at the fortississimo dynamic level;
 - (G) explain how the imperfect rigidity of the tuning pin and the unequal distribution of tension along the entire length of a piano string necessitate proper tuning hammer technique for tuning stability;
 - (H) explain the theory of near coincident partials and the resultant audible beats which make aural tuning possible through the evaluation of beat rates;
 - (I) explain the theory of inharmonicity and how the differences in string dimensions across the range of the piano contributes to deviations in the harmonic series from one string to the next string;
 - (J) demonstrate how changes in string tension affect neighboring strings through the down bearing on the bridge/soundboard, and consequently the need for the procedure known as the pitch raise;
 - (K) demonstrate how the components of the internal mechanism known as the action interact with each other as a complex mechanism designed to capture the artistic expressiveness of the pianist; and
 - (L) demonstrate the ability to evaluate the functioning of action components and make necessary adjustments and repairs.
- (4) The student synthesizes the skills and knowledge learned in levels I, II, and III to perfect their tuning technique in terms of overall efficiency of the tuning process. The student is expected to:
- (A) demonstrate effective unison tuning with 0-1 cent variance;
 - (B) demonstrate effective octave tuning with less than 1-1.5 cent wide variance or demonstration of perfect twelfth;
 - (C) demonstrate effective tuning of perfect fourths with one beat per second wide or 1-2 cents wide variance;
 - (D) demonstrate effective tuning of perfect fifths with less than 1-1.5 cent narrow variance;
 - (E) demonstrate setting a temperament with good fourths and fifths, and major 3rds and major 6ths with beat rates that gradually increase when played ascending the chromatic scale; and
 - (F) demonstrate tuning of all registers of the piano with characteristics of correct octaves, double octaves, triple octaves, quadruple octaves and gradually increasing beat rates of major 10ths, and major 17ths when played ascending the chromatic scale.

- (5) The student learns the basic procedure for restringing a grand piano. The student is expected to:
 - (A) demonstrate the ability to remove and install piano strings correctly;
 - (B) observes and records the stringing scale including: the gauge and location of every string, the correct path of every string, the termination points of every string, and the style and location of any hitch pin loops.
 - (C) interpret a stringing scale diagram accurately;
 - (D) learn the procedure for restringing a piano including
 - (i) removing the action, strings, and tuning pins;
 - (ii) placing jacks under the pin block;
 - (iii) determining the correct size of replacement tuning pins;
 - (iv) measuring and positioning the piano string for installation;
 - (v) completely installing one piano string before beginning to install the next;
 - (vi) forming the coil and beckett in the new tuning pin; and
 - (vii) hammering the tuning pin into the pinblock; and
 - (E) practice a “chip” tuning (a rough tuning in which the strings are plucked since the action is removed) in order to put tension on the newly installed piano strings.
- (6) The student demonstrates the correct procedures for moving a piano. The student is expected to:
 - (A) place the piano on the skid without the lid lip on the skid;
 - (B) center a piano on the dolly properly and stably;
 - (C) wrap a piano to protect the case from the straps;
 - (D) pull the straps taught to hold the piano to the dolly;
 - (E) seal the lid closed;
 - (F) label and wrap piano parts properly;
 - (G) demonstrate proper methods for lifting an upright piano;
 - (H) demonstrate proper techniques for tipping a grand piano both with and without a lyre; and
 - (I) communicate effectively and clearly with piano owner and assistant throughout the process of moving the piano.
- (7) The student accurately assesses the condition of a piano, determines the work that needs to be performed, plans the sequence of steps to complete the work, and executes the necessary procedures efficiently. The student is expected to:
 - (A) evaluate the quality and condition of a piano prior to beginning any work;
 - (B) set realistic goals for what improvements are possible for a given piano;

- (C) decide on the order in which repairs or adjustments can be performed most efficiently;
 - (D) perform the necessary work according to their plan; and
 - (E) evaluate the result and make changes if necessary.
- (8) The student measures and evaluates the condition of the action regulation and plans and executes the appropriate sequence of regulating procedures. The student is expected to:
- (A) take accurate measurements related to the alignment, movement, and performance of various action components;
 - (B) accurately assess components that are out of regulation;
 - (C) plan and perform the correct sequence of steps to complete a full regulation; and
 - (D) evaluate the action's performance after the initial pass and make refining adjustments, as necessary.
- (9) The student demonstrates techniques of tone regulation, also known as voicing, which refers to adjustments to the timbre, sound envelope, and volume rather than pitch. The student is expected to:
- (A) explain and demonstrate the difference between tone regulation and tuning;
 - (B) explain and demonstrate the difference between "voicing up" (described as making the tone "brighter") and "voicing down" (described as making the tone "warmer" or "softer");
 - (C) identify the crown, undercrown, core, shoulders and undershoulders of a hammer as well as describe how needling each area changes tone regulation;
 - (D) explain and demonstrate the importance of mating the hammers to the strings prior to needling the hammers;
 - (E) demonstrate the technique of applying lacquer to the hammers to voice the hammer up;
 - (F) demonstrate the technique of needling the hammer in different locations to selectively adjust volume, brightness, sustain, and clarity of tone;
 - (G) evaluate the volume and timbre of a tone continually while making small adjustments in order to achieve consistency of tone from one key to the next; and
 - (H) explain and demonstrate the technique of reshaping worn hammers to reform the strike point and increase clarity of tone.
- (10) The student explains concepts of entrepreneurship. The student is expected to:
- (A) define entrepreneurship and entrepreneur;
 - (B) analyze the advantages and disadvantages of entrepreneurship;
 - (C) investigate business opportunities in instrument repair; and
 - (D) identify and analyze the four functions of a small business.

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- (11) The student identifies the importance of a well-written business plan. The student is expected to:
- (A) identify the need for and the characteristics of a well-orchestrated business plan;
 - (B) research business plan outlines, resources, and templates; and
 - (C) create and present a well-orchestrated business plan and critically explain the contents.

Resources

- Collection of good and poor condition pianos
- Collection of piano tuning levers and piano tuning mute strips and felts
- Piano Action regulating tool sets
- Piano stringing tool sets
- Various screwdrivers
- Socket set
- Drill index
- Various piano bushing cauls and felts
- Mobile worktables and tool carts
- Various industry related jigs
- Stock parts
- Action models by various manufacturers
- Various woodworking tools-- bandsaw, standing belt sander, standing drill press, planer (hand and machine), routers, hand drills
- Dust collection systems

Technology

iPad with tuning apps: Cybertuner™, Verituner™, TuneLab™ and PiaTune™

- Reyburn Piano Services, Inc. (2019) Cybertuner™ (version 7.9.2) [Mobile application software]
- Veritune, Inc. (2018) Verituner™ (version 4.7.7) [Mobile application software]
- Real-Time Specialties (2017) TuneLab Piano Tuner™ (version 4.3.1) [Mobile application software]
- HAKKI BAYKA (2018) PiaTune™ (version 2.1) [Mobile application software]

Instructional Materials

Grec, M. *Pianos Inside Out: A Comprehensive Guide to Piano Tuning, Repairing and Rebuilding*. Mandeville, LA: In Tune Press, 2013.

Potter, R. *The Piano Action Handbook*. Kansas City, MO: Piano Technicians Guild Foundation Press, 1991.

Reblitz, A. A. *Piano Servicing, Tuning and Rebuilding: A Guide for the Professional, Student, and Hobbyist*. Lanham: Rowman & Littlefield, 2019.

Travis, J. W. *A Guide to Restrunging*. Takoma Park, MD: J.W. Travis, 1982.

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Kottick, E. L. *The Harpsichord Owners Guide: A Manual for Buyers and Owners*. United States: The University of North Carolina Press, 2013.

The Piano Technicians Guild Foundation Press. (2019) *The Piano Technicians Journal*.

Recommended Course Activities:

- Piano tuning practice
- Daily lectures in tuning theory
- Tuning and repair one-on-one lessons
- Tuning and repair group lessons
- Masterclasses from visiting technicians
- Attend existing workshops
- Practicum tuning and repairing pianos within the campus or district
- Internship at university piano technician programs and/or local area piano retailers

Suggested methods for evaluating student outcomes:

Students will be evaluated based upon results obtained from measurements made from exacting industry standard jigs, guides, and listening devices, with their grades calculated and recorded based upon syllabus standards.

- Tuning Hammer Technique—Demonstrates proper holding of the tuning hammer that allows for correct setting of the pin.
- Tuning Stability—Demonstrates setting the pin in such a way that allows for no cent variation when hit at a FFF Blow.
- Active Work Record—Maintains an active record of work on paper and online using digital record keeping systems.
- Shop Safety—Follows assigned safety protocols in shop workspaces.
- Parts and Design—Properly identifies various parts of the piano and can use proper nomenclature.
- Unison Tuning—Demonstrates accurate tuning with no variance or less than 1 cent variance.
- Octave Tuning—Demonstrates accurate tuning with less than 1 cent variance WIDE or demonstration of perfect 12th.
- 4th Tuning—Demonstrates accurate tuning with 1 beat per second WIDE.
- 5th Tuning—Demonstrates accurate tuning with less than 1 cent NARROW.
- 3rd Tuning—Demonstrates accurate tuning by continually building in speed during chromatic 3rd scales, evenly and slowly.

Teacher qualifications:

An assignment for Piano Technician I-IV is allowed with one of the following certificates.

- All-Level Music.
- Grades 6-12 or Grades 9-12-Music.
- Junior High School (Grades 9-10 only) or High School-Music.
- Music: Early Childhood-Grade 12.
- Secondary Music (Grades 6-12).

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- Trade and Industrial Education: Grade 6-12.
- Trade and Industrial Education: Grade 8-12.

Experience as a Master Piano Technician as determined by recognized manufacturer's standards is required as is certification in Piano Technology from a recognized school or an apprenticeship program through a recognized piano manufacturer (Steinway, Kawai, Boesendorfer and Yamaha).

Additional information:

- Additional training through collaboration with the University of Houston Moores School of Music Master Piano Technician program. Due to the collaborative nature of our relationship with the Moores School of Music, some training will be included at no additional cost.
- Additional training through collaboration with Steinway Piano Gallery, piano retailers, as well as Steinway & Sons, piano manufacturers. Due to the collaborative nature of our relationship with Steinway Piano Gallery and Steinway & Sons, some training will be included at no additional cost. There will be piano technician trainings at the Steinway & Sons factory. Anticipated additional training costs \$6,000 to cover travel and expenses at the Steinway factory in Queens, New York.